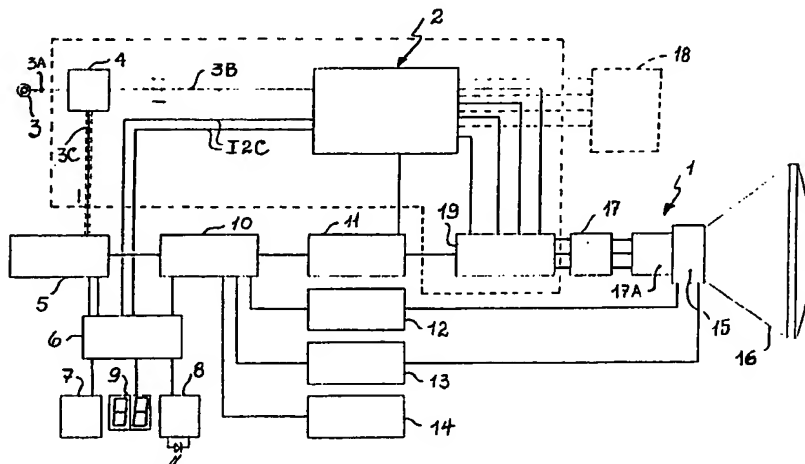




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : H04N 7/16		A1	(11) International Publication Number: WO 90/13206 (43) International Publication Date: 1 November 1990 (01.11.90)
(21) International Application Number: PCT/NO90/00073 (22) International Filing Date: 23 April 1990 (23.04.90) (30) Priority data: 891690 24 April 1989 (24.04.89) NO (71) Applicant (for all designated States except US): COMPLAN NETWORK A/S [NO/NO]; Box 186, N-1360 Nesbru (NO). (72) Inventors; and (75) Inventors/Applicants (for US only) : GYSLER, Tom [NO/NO]; Granveien 41, N-1360 Nesbru (NO). LEER, Knut [NO/NO]; Fredrik Stangs gate 12, N-0272 Oslo 2 (NO). (74) Agent: OSLO PATENTKONTOR A/S DR. ING. K.O. BERG; Dr. Ing. K.O. Berg, P.O. Box 7007 H, N-0306 Oslo 3 (NO).		(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), + CH, CH (European patent), CM (OAPI patent), DE, + DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US. Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	

(54) Title: ARRANGEMENT IN A TELEVISION COMMUNICATION SYSTEM



(57) Abstract

The present invention relates to an arrangement in a television communication system, comprising a central control unit (25) communicating with a plurality of identifiable user apparatus (TV1, TV2, etc.), and in order to provide communication of sound, text and video signals which are passed on through any existing high frequency analogue signal medium, it is according to the invention suggested that the television communication system comprises a further system providing digital one-way and/or two-way communication signals, independently of standardized analogue high frequency or television signals, and providing conversion of said digital signals to audio and/or video signals in a special module means (2) included in each user apparatus (1). This special module means (2) for communication of sound, text and video signals independently of the analogue (HF/TV) video signals may appropriately be made as an integrated module of a user apparatus (1), and by appropriate storage means, the special module means (2) may communicate with the central unit (25) for the immediate execution, further execution or logging of information received therefrom, at any appropriate time and independently of whether the television apparatus in question is switched on or off. Further, by appropriate software included in the special module means (2) any information may be presented to the user in his own language, whether this is any European language, Chinese or Japanese.

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ARRANGEMENT IN A TELEVISION COMMUNICATION SYSTEM

Field of the invention

The present invention relates to an arrangement in a television communication system, comprising a central control unit communicating with a plurality of identifiable user apparatus.

Field of application

5 The present invention finds application in connection with oil platforms, hotels, airports and exhibition areas, in which it is required to present information to the subscribers or users, independently of the channel or the
10 program which is watched by the user. This information should be presented to either a specific television apparatus having a specific physical location, to groups of television apparatus having a mutual common identity and being installed at locations which are to be defined
15 physically, or to all television apparatus within the same system.

Prior art

20 There are previously known related television communication systems within the above fields of application, but these systems have not been able to generate a high resolution video picture in the television apparatus representing graphic character sets. Such graphic or font characters
25 could for example be Hebrew, Chinese, Japanese, cyrillic, etc. printing signs. Further, none of these systems are able to generate a video picture or sound in the television apparatus on the basis of a digital transmission to said apparatus.

30

Besides, the prior art suggest a device which is provided

externally to the television apparatus, for example in its own cabinet. This is a solution which requires a separate current supply and a separate receiver channel including modulator/demodulator and circuits for intermediate
5 frequencies. In other words, this prior art technique involves the duplication of components already included in the television apparatus, resulting in correspondingly higher production costs and poor economy.

10 Further the receiver unit in a television system processes the analogue video signal, and modulates the same up to a specific television channel. However, this implies a derogation of the signal to the antenna input of the television apparatus, due to noise, synchronizing and
15 interference, etc. This will be the case in all previously known information systems belonging to the prior art.

EP 0128769 and GB 2118750 disclose a technique as discussed above. In addition, these prior art systems are used for
20 coding and decoding, i.e. scrambling, of video signals in a Pay television system, which is intended for use in another user group.

There is also known an ASIS system of 2 M Electronics, which
25 is based on a technique including picture/information transmission, wherein the signals are transferred in or as a part of the video signal, and wherein the picture is provided as a line 16/TELE-TEXT. However, this system involves a reduced transmission speed and reduced overall
30 capacity, due to the narrow bandwidth/slot included therein.

In the above systems a malfunction of the control unit would involve that the system is completely isolated from all standard television functions. By selecting function, these
35 must be operated on the external panel and/or through a separate remote control connected to the external unit.

Other prior art patent specifications disclose systems

having a further limitation in number of transmissions or channels to be used for analogue message information and pay television channels.

5 US 3.057.829 discloses a pay TV or control monitoring system using frequencies outside the standardized TV frequency range, adapted for only transmitting analogue HF/video signals for the subsequent modulation thereof to a standard video HF channel. This system includes a limitation of two
10 service programs plus two video programs provides no video information, and provides only one-way digital reporting about position of mechanical selector.

US 4.090.220 discloses a pay TV system based on one cable
15 per analogue TV channel and suggests a cable system including up to 34 coaxial cables running in parallel from each selector unit, and further a twisted 2 pair cable for each subscriber, wherein only one analogue HF/TV video signal can be selected one at the time among said 34. The
20 disclosed system is not a standard cable system, and consequently discloses a completely different technique.

US 4.369.828 discloses a power load control and bilateral signalling apparatus, i.e. an apparatus for controlling
25 electro mechanical devices, including for example air conditioners and heaters, etc., and the analogue HF/TV video signals may be transmitted outside the standardized TV frequency range for later being modulated to a standard HF/TV channel. The system also includes digital transmis-
30 sion, but for quite another purpose than suggested by the present invention. The prior art system allows for no video information, and is limited to the transmission of off air video programs between channel 6 and 7.

35 US 4.015.074 relates to an information system for the transmission of a specific analogue information via a cable system, including a message to each individual television apparatus. The analogue information signal and a direct

current signal are transmitted through the cable system and to a unit at the television apparatus, in which unit the direct current signal activates a relay which connects the input analogue HF/TV signal to a modulator. The output from the modulator is connected to the intermediate frequency stage of the television apparatus, and consequently operates as a channel receiver. However, this system includes no connection to the RGB video circuits, and the prior art system neither allows for the installation of a special unit in each television apparatus, and the further transmission of the information signals takes place from person to person. Neither does this prior art system suggest digital transmission of relevant data.

All of the above prior art systems discussed above are dependent on modulated analogue video signals, or television signals, for achieving their functionality.

Disclosure of the invention

An object of the present invention is to provide an arrangement in a television communication system which functions as a message distributor without any analogue signals being transmitted through the cable system.

Another object of the present invention is to avoid that a malfunction in the circuits included in the television communication system should not influence the normal television transmission.

Yet another object of the present invention is to provide a television communication system which is not limited in the number of channels designed as standard HF/TV channels used for special purposes, for example pay television, group television, information television, etc.

Still another object of the present invention is to provide a television communication system which provides a special

further system providing digital one-way and/or two-way communication signals to a plurality of users, independently of analogue high frequency video signals, and the transmission of information in both directions with a very high speed, for example 10 M bits per second, and a still higher typical speed by use of optical cables.

Further, an object of the present invention is to provide a further system including high quality graphic modus for presenting a picture having higher resolution than a standard teletext picture, especially for presenting graphics, other fonts, Chinese writing signs, etc.

Still another object of the present invention is to provide a special module means included in each user apparatus and arranged for utilizing existing functions, current supply and signals in the existing television apparatus, for example for remote control, channel selection, synchronization, sleep on/off, etc., and thus keep the installation thereof very simple and at low cost.

Further disclosure of the invention

In an arrangement in a television communication system, comprising a central control unit communicating with a plurality of identifiable user apparatus, as stated in the preamble of this specification, the above objects are achieved in accordance with the present invention in that the arrangement comprises a further system providing digital one-way and/or two-way communication signals, independently of standardized analogue high frequency or television signals, and providing conversion of said digital signals to audio and/video signals in a means, preferably a special module means, included in each user apparatus.

Preferably, said module means is adapted for communication of sound, text and video signals through the same medium as all other usual standardized high frequency television

signals, but independently thereof.

Still preferably, the module means for communication of sound, text and video signals is provided as an integrated
5 module of a user apparatus.

It is to be understood that the digital communication of sound, text and video signals of said special module means is performed through phase shift modulation, puls code
10 modulation, or similar, in which said signals are represented in digital form.

In an preferred embodiment said module means for communication of sound, text and video signals comprises an input
15 connected to a splitter means which is also connected to the input medium of the user apparatus, and an output connected to the video colour circuits of the apparatus.

Further, it is convenient that said module means for
20 communication of sound, text and video signals comprises a storage unit for storing information relating to audio and/or video information, for presenting same through an associated user apparatus, load speaker and/or screen, respectively.

25 It is further to be understood that it is appropriate that each module means in a separate television apparatus comprises a unique identity, for example a logic digital address through which the central unit can communicate after
30 the-selection thereof.

Corresepndingly, each module means may comprise a preferably programmable group identity, for example a logic digital group address, through which the central unit can communi-
35 cate after pre-selection thereof, and possibly at the same time.

In consequence thereof, said module means for communication

of sound, text and video signals is adapted to communicate with said central unit, so as present any data to an individual apparatus, a group of apparatus or all apparatus connected therewith, independently of whether the television apparatus in question is or are switched on or off.

In order to facilitate the overall control of each apparatus, said module means for communication of sound, text and video signals, when implemented in a television apparatus, may be connected to the micro controller bus of the apparatus, for thereby allowing control of said module means through any standard or modified operating unit(s) for the apparatus in question.

In this connection, said module means could then also be allowed to control the electronic circuits and functions of the apparatus in a manner corresponding to the standard remote control operating unit(s) of the apparatus in question.

It is to be understood that the communication with any television apparatus may take place through a standard medium, i.e. cable, fibres, links, micro waves, etc.

Brief description of the drawings

The invention will now be further disclosed in connection with the following description taken in conjunction with the enclosed drawings.

Fig. 1 is a block diagram of a standard television apparatus in which the present invention is implemented.

Fig. 2 is a block diagram of a special module means according to the present invention.

Fig. 3 illustrates a typical television cable installation comprising a plurality of user apparatus and a control unit.

Description of preferred embodiments

5 In Fig. 1, which is a block diagram of a standard television apparatus, for example of European model, the television apparatus has been designated generally by reference numeral 1 and in connection with such a television apparatus the present invention can be implemented for example as a special module means, here designated generally by reference
10 numeral 2.

As further illustrated in Fig. 1, the television apparatus 1 is connected to an input antenna 3, through a splitter 4, which makes part of the present invention, and the antenna
15 input is further connected to a channel selector 5 which communicates with a micro controller unit 6, which in turn receives command signals from a front panel 7 or through a sender/receiver-unit 8, adapted for operation through a remote control unit (not illustrated) by means of for
20 example infrared radiation. The micro controller 8 is also connected to a display unit 9, for indicating for example the selected channel, or for any other information relating to the modus of the television apparatus in question.

25 The channel selector 5 communicates with the micro controller 6 via a so-called I2C bus which can be modified according to requirements, i.e. through the software which can be implemented in the micro controller 6.

30 The channel selector 5, as well as the micro controller 6 also communicate with an MF/IF synchronizing unit 10, which in turn controls a colour decoder unit 11, a unit for vertical circuits 12, a unit for horizontal circuits 13 as well as unit for audio circuits 14.

35

It is to be noted that the unit for audio circuits 14 may control not illustrated load speakers, whereas the units for vertical circuits 12 and horizontal circuits 13 are

connected to the deviation coil 15 of the television screen 16, whereas the colour decoding unit 11 has its output connected through a video amplifier 17 which amplifies each of the colours in question, i.e. red, green and blue, each
5 of which colour is transmitted to an electronic beam gun, 17A prior to being influenced by the deviation coil 15 for reconstruction of the colour picture on the screen 16.

In connection with the television apparatus 1, illustrated
10 in Fig. 1, the present invention which relate to an arrangement in a television communication system, comprising a central control unit communicating with a plurality of identifiable user apparatus, for example the apparatus as disclosed so far, the present invention has been implemented
15 therein so as to constitute a further system providing digital one-way and/or two-way communication signals, independently of standardized analogue high frequency or television signals, and providing conversion of said digital signals to audio and/or video signals in for example the
20 special module means 2, included in the apparatus 1 illustrated in Fig. 1.

Consequently, Fig. 1 illustrates a preferred embodiment wherein the invention has been implemented preferably as a
25 special module means 2, which preferably constitutes an integrated module of the user apparatus 1. Thus, the special module means 2 may utilize existing functions, current supply and signals in the existing television apparatus. Further, to bring forth an appropriate communication with
30 the signals received through the antenna 3, the splitter 4 has been included in the antenna cable 3A so as to split the antenna cable 3A in a first connection between said splitter 4 and the special module means 2 as indicated by the connection 3B, as well as in a second connection 3C between
35 said splitter 4 and said channel selector 5.

It is to be understood that the splitter 4 may be included
.. in the special module means 2, the output from the antenna 3

then being connected directly thereto, and from there connected to the channel selector 5 of the apparatus in question.

5 By either interconnection of the splitter 4 and the special module means 2, the system allows for the use of the existing remote control of the television apparatus, especially through the I2C bus, and especially for controlling the functions relating to the present invention, and
10 being appropriately materialized in the special module means 2.

In television apparatus having no teletext, as illustrated by the dashed box 18, the special module means 2 may be
15 adapted to each model of the television apparatus in question. Since any apparatus lacking a teletext unit 18, does not include an analogue switch 19, such analogue switch 19 may be included as a part of the special module means 2, the connection thereof being in parallel between the colour
20 decoder 11 and the video amplifier 17. In other words, the analogue switch 19 will in this case most appropriately be part of the special module means 2 which in turn most appropriately may be laid out as a separate digital communication, text and processing card. The mounting
25 thereof can then take place by using existing sockets in a television apparatus, or the special module means for communication of sound, text and video signals according to the present invention may be integrated in the other circuits of any apparatus, preferably during the line
30 production of such apparatus. In television apparatus having sockets for teletext cards, the special card module means according to the present invention could possibly be mounted in the same socket as adapted for said teletext card.

35 Fig. 2 illustrates a block diagram of a special module means according to the present invention, in which the module means 2 itself comprises a text and graphic processor 2A, a random access memory 2B, as well as a combined unit 2C which

operates as a video/text interface and also an analogue switch. The Fig. 2 embodiment also illustrates how the special module means 2 is interconnected with the micro controller 6, which otherwise communicates with a read only memory 6A and a random access memory 6B, as well as a modem unit 6C. The modem unit 6C communicates with the splitter 4 which in turn receives signals from the antenna 3 via the antenna medium 3A, which for example may be any appropriate medium.

10

Fig. 3 illustrates a typical television cable installation, in which the present invention can find specific application, and in which each television apparatus includes for example the special embodiment of the module means disclosed above.

15

In Fig. 3 there are illustrated a plurality of identifiable user apparatus indicated TV1, TV2, TV3 etc., which may belong to group I as well as other individual identifiable user apparatus TV1A, TV2A, etc., which may belong to group II.

20

All of said television apparatus are connected to a common television medium, for example a television cable 3A, which in turn via a distribution unit 20 is connected to a central computer 21 which may monitor the complete television communication system, as well as to standard high frequency video channels, as indicated by reference numeral 3D. The high frequency video channel 3D is further via an amplifier 22 receiving signals from any type of antennas and associated receivers, for example a satellite receiver 3SR, and a beam antenna 3RA, which through the cable 3AA delivers high frequency video signals to a selector box 23. The selector box 23 also receives signals from a plurality of video players 24A, 24B, 24C from which any appropriate recorded video programs may be distributed on to the present television communication system illustrated in Fig. 3.

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By means of the further system represented by the present invention, and providing the above disclosed digital one-way and/or two-way communication signals, namely independently of the standardized analogue high frequency or television signals, it is possible for the central computer 21, possibly in communication with a further special computer, to further communicate with each television apparatus, or selected groups thereof.

10 This is due to the fact that the conversion of said digital signals to audio and/or video signals is provided by a special module means which may be included in each user apparatus, and which may be controlled by a central control unit, for example the control unit 25 associated with the
15 main computer 21. The digital one-way and/or two-way communication signals, i.e. for communication of sound, text and video signals takes place through the same medium as all other usual standardized high frequency television signals, that is through the medium 3A illustrated in Fig. 3, but
20 independently of said standardized high frequency television signals.

By appropriate operation of the control unit 25, it is possible to select each individual module means in each
25 apparatus, and most appropriately this digital one-way and/or two-way communication of signals is performed through phase shift modulation, pulse code modulation or similar, and in which modulation said signals are represented in digital form. The digital data received in each apparatus
30 are processed in accordance with the software included in each special module means for implementing the supervision, control or generation of text, sound or picture as programmed and transmitted by the central control unit 25. In each apparatus the processor 2A for processing text an
35 graphics will process the picture information from the data signals directly, or from any appropriate memory connected thereto. At an appropriate point of time, the picture is outputted as video RGB signals to the analogue switch 2C

(19), and depending on the command signals associated therewith, the RGB signals will be presented on the screen 16 as a high resolution picture, or superimposed on the standard video pictures, possibly upon the teletext.

5

The special module means according to the present invention is, as discussed in connection with Fig. 1, integrated with the standard control means of the individual TV apparatus, for thereby allowing an external control of each apparatus, such that the apparatus is still adapted for switching to specific channels or text information or for the execution of other functions. These other functions may include remote control, the switching on of the television apparatus from the control unit 25 of the main computer 21, for example for alarm indication, and said functions also include messages for groups of users, or messages to all apparatus.

In the same manner as the incoming digital signals are transmitted from the central control unit 25, the local control functions, including remote control or panel control, will allow for return transmission of messages, for example a reply to the functions presented on the picture screen. Such functions or messages may be presented as menus, and the remote control or the panel control of each apparatus would then, of course, also include a menu controlled reply function back to the central control unit.

In connection with the various fields of application or user groups, the special module means may for the communication with the central control unit, include various types of software taking care of any function having special reference thereto.

When considering the present communication system installed in a hotel, or possibly in a group of hotels, the information presented through this digital one-way and/or two-way communication independently of standardized analogue high frequency or television signals, may include any internal

messages to the guests, for example about opening hours for restaurant, bar or discotheques, as well as serving of meals and menus related thereto. Opening hours for musical events and entertainment may also be included in the messages from the central unit, as well as ordering of tables via the remote control, information about flight departures could in a special embodiment possibly be received on-line from the airport through the central control unit.

10 News may be presented as extracts from for example newspapers, but then in the guest's own language via the central computer.

Room service may of course be included in this communication, both as regards the ordering thereof and any appropriate time for the execution thereof.

Included in the service to be performed by the present television communication system is also video channel control, in which for example video films which are not appropriate for children, could be blocked in any separate room or any groups of rooms. This service may also include the transmission of information between groups of guests, including direct transmission from the meeting room of any group.

Exchange of messages to each guest through the associated television apparatus in the guest room is also contemplated, such message information also allowing for a feed-back message for the receipt of said message information.

Such information could also be transmitted to a group of guests, including feed-back of each individual guest.

35 Common messages to all rooms of one or more stores about fire or smoke alarm may also be included, such messages also including information with pictures regarding possible escape or emergency exits.

- In connection with oil platforms it would be appropriate to include any security system in the present television communication system, in which messages of all types of
- 5 alarms could be transmitted to groups or individual rooms or associated television apparatus. Also in this connection any escape exits including indication of not launched lifeboats would be appropriate.
- 10 In connection with congresses and exhibitions the present digital one-way and/or two-way communication system would be appropriate for transferring information to groups or specific areas included in the overall congress or exhibition area. Simultaneous interpretation of various languages
- 15 may be implementet, including selection of any appropriate language, which selection may also include channels for people with reduced hearing ability.
- In connection with hospitals a selection of entertainment
- 20 programs would be contemplated, as well as a control thereof for the various groups of patients. For example, the children's division should be excluded from what is presented for adults, and possibly any television apparatus could be switched off during certain time intervals.
- 25 Messages could be provided for individual persons, for any staff or for any patient. Alarms including emergency and mobilization of specific groups could also be included.
- 30 It is to be understood that by means of the specific module means according to the present invention, which is adapted for communication of sound, text and video signals independently of the standardized high frequency television signals, and which includes any appropriate software program for
- 35 sound, text and video, all of the above described messages including internal information, can be provided in a language understandable for the user invloved, or the guest in question. The present arrangement is also, in addition

to usual text, able to provide individual graphic fonts,
for example cyrillic, Chinese or Japanese language signs.

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P a t e n t c l a i m s

1. Arrangement in a television communication system,
comprising a central control unit (25) communicating with a
5 plurality of identifiable user apparatus (TV1, TV2, etc),
c h a r a c t e r i z e d i n that the arrangement
comprises a further system providing digital one-way and/or
two-way communication signals, independently of standardized
analogue high frequency or television signals, and providing
10 conversion of said digital signals to audio and/or video
signals in a means, preferably a special module means (2)
included in each user apparatus (TV1, TV2, etc.).
2. Arrangement as claimed in claim 1,
15 c h a r a c t e r i z e d i n that said module means (2)
is adapted for communication of sound, text and video
signals through the same medium (3A, 3B, 3C) as all other
usual standardized high frequency television signals, but
independently thereof.
- 20 3. System as claimed in claim 1 or 2,
c h a r a c t e r i z e d i n that the module means (2)
for communication of sound, text and video signals is an
integrated module of a user apparatus (1).
- 25 4. Arrangement as claimed in claim 1 - 3,
c h a r a c t e r i z e d i n that the digital communica-
tion of sound, text and video signals of said module means
(2) is performed through phase shift modulation, pulse code
30 modulation or similar, in which said signals are represented
in digital form.
5. Arrangement as claimed in claim 1 - 4,
c a h a r a c t e r i z e d i n that said module means
35 for communication of sound, text and video signals comprises
an input (3B) connected to a splitter means (4) pre-
connected to the input medium (3A) of the user apparatus
(1), and comprises an output (2X) connected to the video

colour circuits (11) of the apparatus (1).

6. Arrangement as claimed in claim 1 - 5,
c h a r a c t e r i z e d i n that said module means (2)
5 for communication of sound, text and video signals comprises
a storage unit (2B) for storing information relating to
audio and/or video information, for presenting same through
an associated user apparatus loud speaker and/or screen,
respectively.

10

7. Arrangement as claimed in any of the claims 1 - 6,
c h a r a c t e r i z e d i n that each module means (2)
for communication of sound, text and video signals in a
respective television apparatus (1) comprises a unique
15 identity, for example a logic digital address, through which
the central unit (25) can communicate after pre-selection
thereof.

8. Arrangement as claimed in any of the claims 1 - 7,
20 c h a r a c t e r i z e d i n that each module means for
communication of sound, text and video signals comprises a,
preferably programable, group identity, for example a logic
digital group address, through which the central unit (25)
can communicate after pre-selection thereof, and possibly at
25 the same time.

9. Arrangement as claimed in claim 6, 7 or 8,
c h a r a c t e r i z e d i n that said module means for
communication of sound, text and video signals is adapted to
30 communicate with said central unit (25) so as to present any
data to an individual apparatus, a group of apparatus or all
apparatus connected therewith, independently of whether the
television apparatus in question is or are switched on or
off.

35

10. Arrangement as claimed in any of the preceding claims,
c h a r a c t e r i z e d i n that the module means for
communication of sound, text and video signals, when

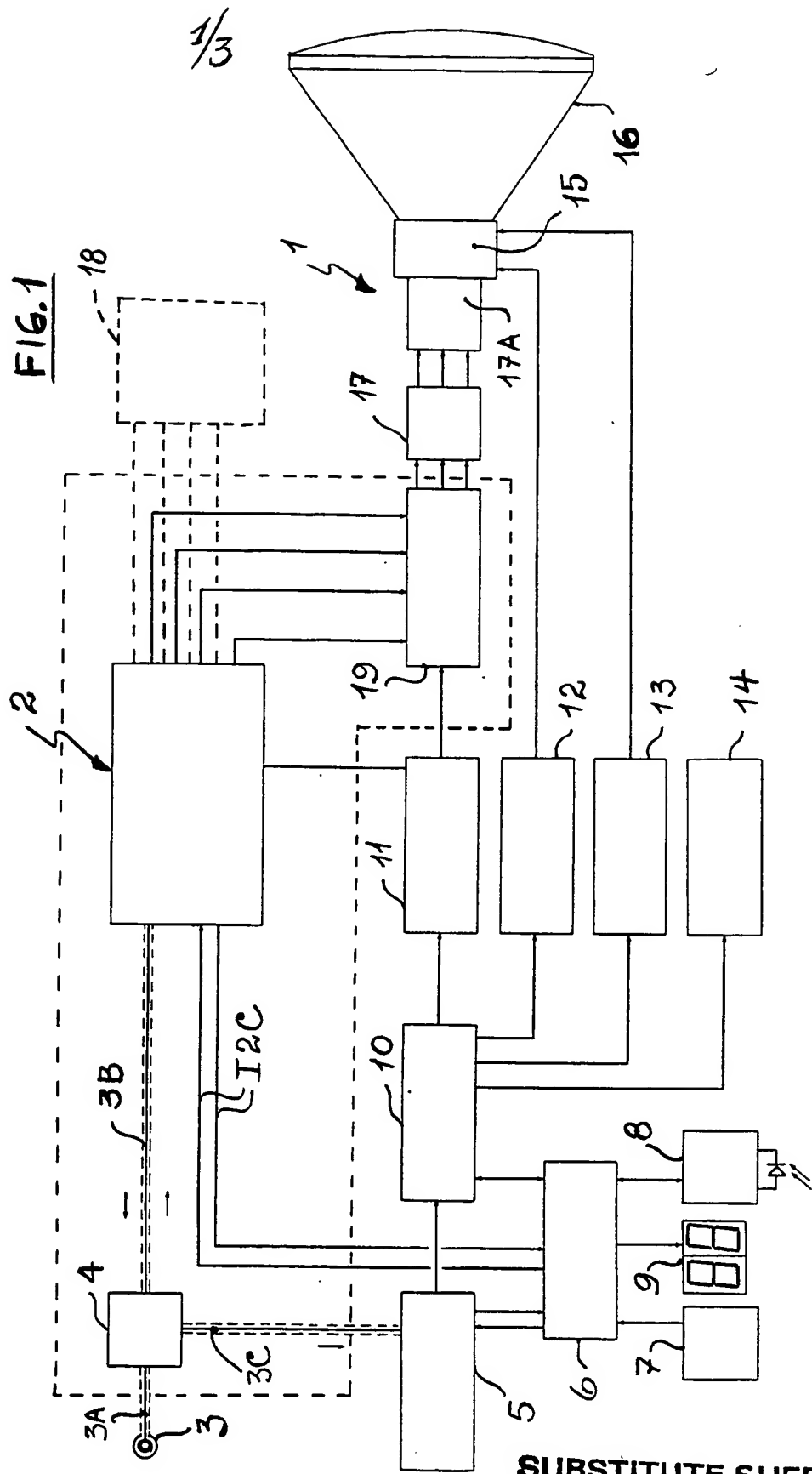
the micro controller bus (6, I2C) of the apparatus (1) for thereby allowing control of said module means through any standard or modified operating unit(s) for the apparatus.

- 5 11. Arrangement as claimed in any of the preceding claims, characterized in that the module means for communication of sound, text and video signals, when implemented in a television apparatus (1), and being connected to the micro controller bus (6, I2C) of the
10 apparatus, said module means is also allowed to control the electronic circuits and functions of the apparatus in a manner corresponding to the standard remote control operating unit(s) of said apparatus.
- 15 12. Arrangement as claimed in any of the preceding claims, characterized in that the communication between the central unit (25) and the special module means (2) in any television apparatus (1) takes place through a standard medium, i.e. cable, fibres, links, micro-waves,
20 etc.

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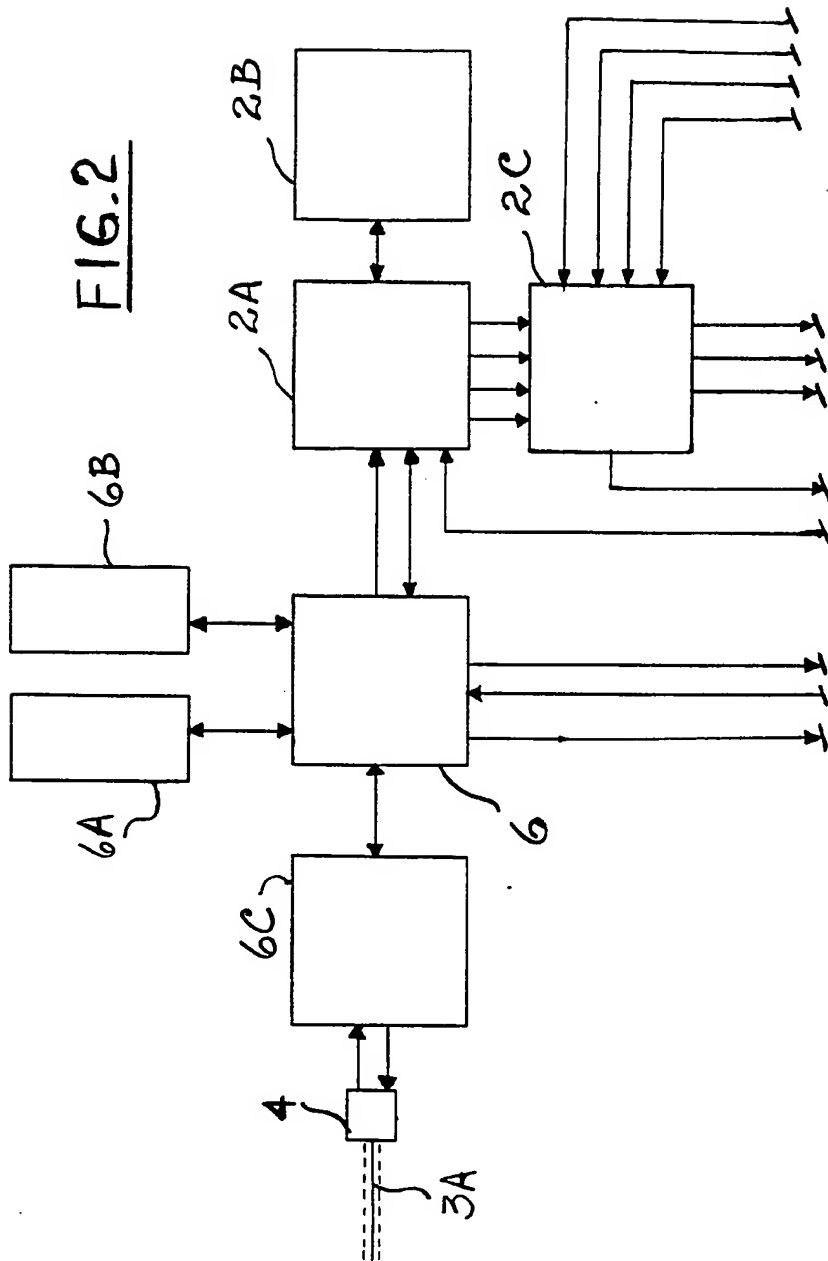
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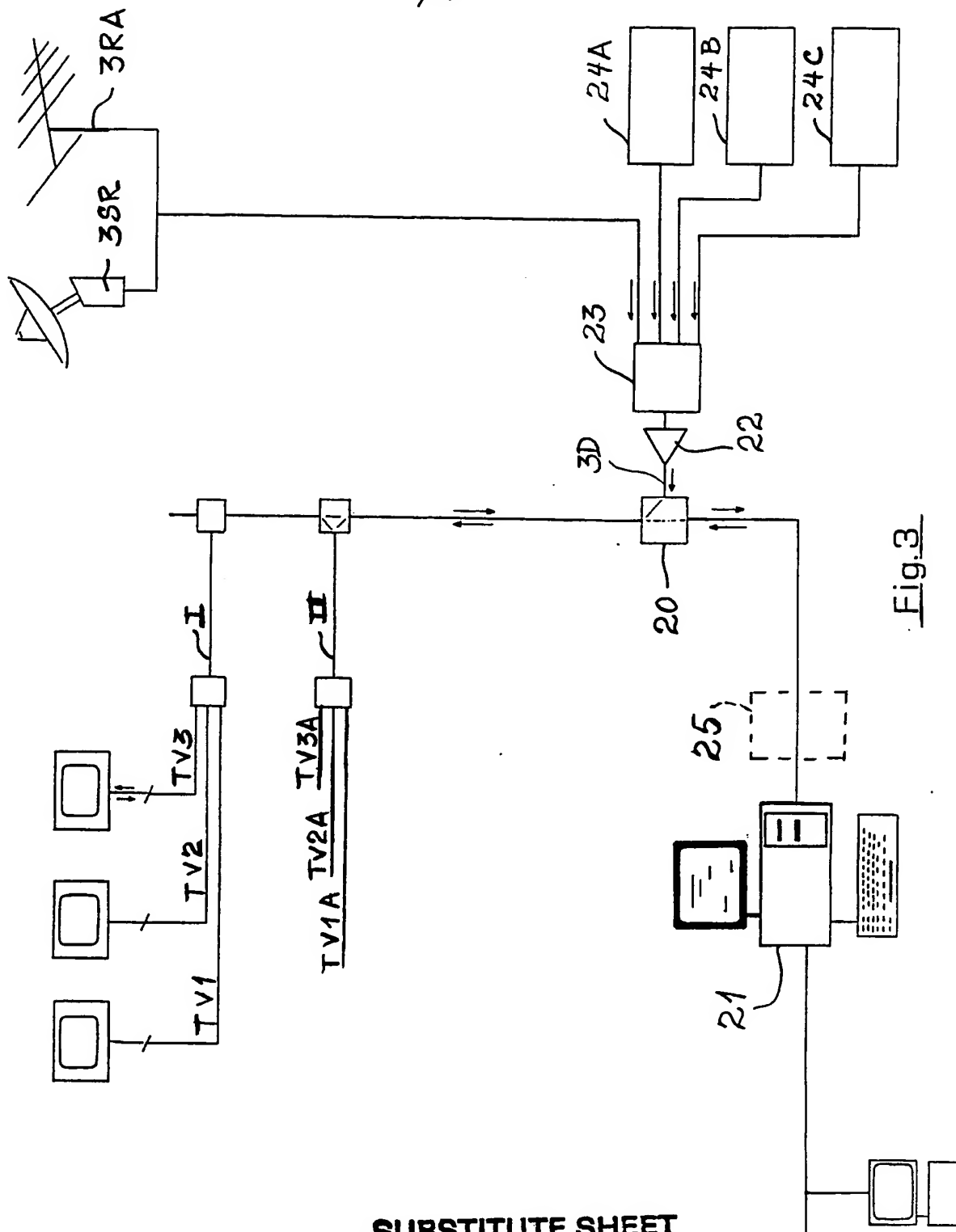
$$\frac{3}{3}$$


Fig. 3

SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

International Application No PCT/NO 90/00073

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC5: H 04 N 7/16		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC5	H 04 N	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched ⁸		
SE,DK,FI,NO classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	US, A, 4057829. (R.M. MOOREHEAD) 8 November 1977, see abstract --	1-12
Y	US, A, 4090220 (E.J. GARGINI) 16 May 1978, see abstract --	1-12
Y	US, A, 4360828 (R.S. BRIGGS, JR. ET AL) 23 November 1982, see abstract --	1-12
Y	US, A, 4015074 (Y. INOUE ET AL) 29 March 1977, see abstract -- -----	1-12
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
20th August 1990	1990-08-21	
International Searching Authority	Signature of Authorized Officer	
SWEDISH PATENT OFFICE	Bertil Ljungdahl <i>Bertil Ljungdahl</i>	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/NO 90/00073**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 90-08-02
The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4057829	77-11-08	NONE	
US-A- 4090220	78-05-16	NONE	
US-A- 4360828	82-11-23	CA-A- 1116714	82-01-19
		DE-A- 2916905	80-02-21
		GB-A-B- 2027961	80-02-27
		JP-A- 55026094	80-02-25
US-A- 4015074	77-03-29	CH-A- 591195	77-09-15
		DE-A-B-C 2605915	76-08-26
		FR-A-B- 2301143	76-09-10
		GB-A- 1507104	78-04-12
		JP-C- 928275	78-10-13
		JP-A- 51096667	76-08-25
		JP-B- 53005074	78-02-23